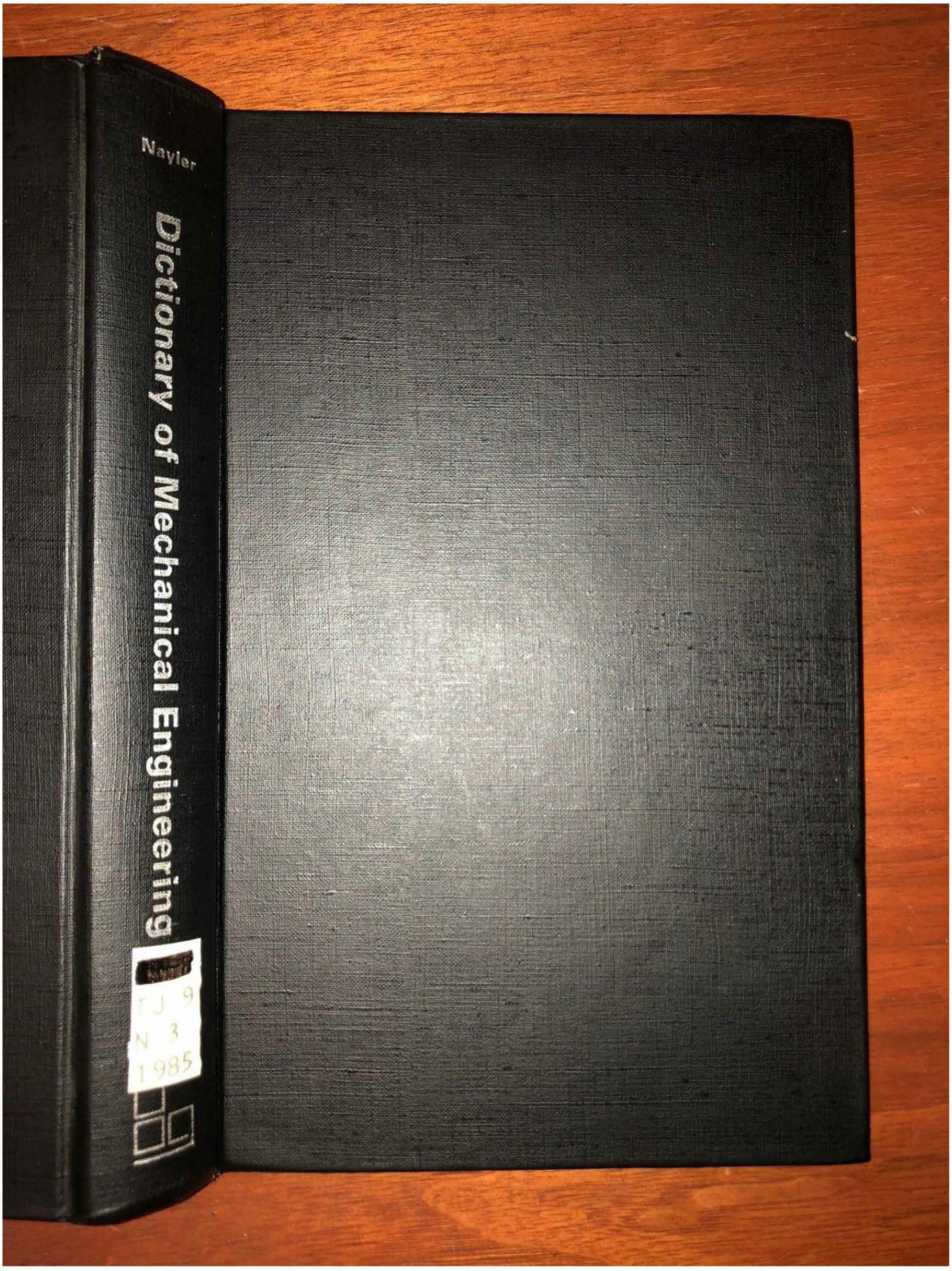
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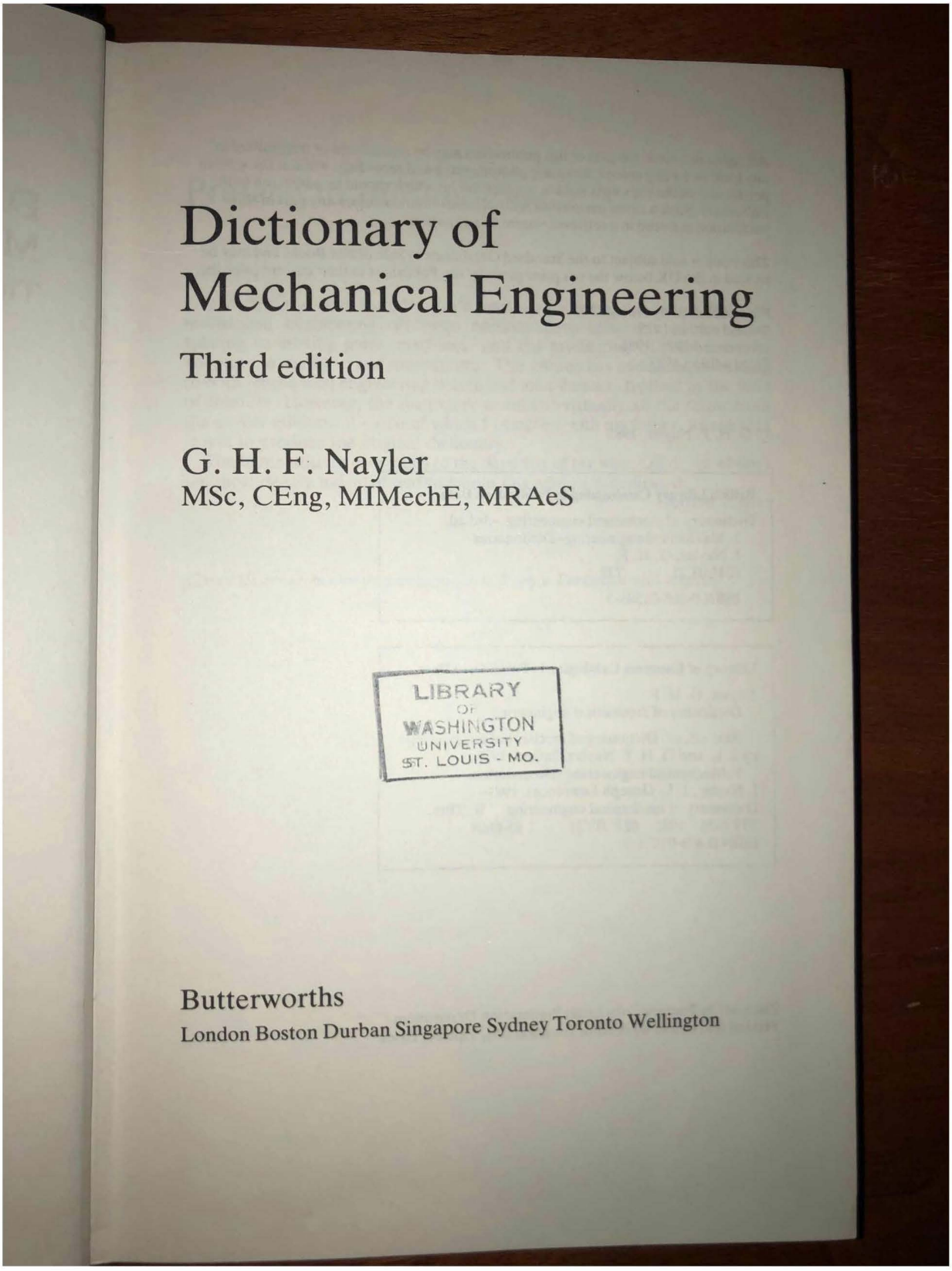

Dictionary of Mechanical Engineering

Third edition

G. H. F. Nayler
MSc, CEng, MIMechE, MRAeS

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Preface to

The dictionary no
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Cover illustration

chamfered (*a*) Rounded or given a radius. (*b*) Given a ***chamfer.***

chamfering machine A machine for forming the bevels of nuts and rounding the ends of bolts.

change wheels The gear-wheel through which the ***lead screw*** of a screw-cutting lathe is driven from the ***mandrel;*** the wheels are changed to vary the reduction ratio.

chapters The Roman numerals used to indicate the positions of the hours on clocks and watches.

Charpy Test A ***notched-bar test*** in which a specimen, notched at the middle and fixed at both ends, is struck behind the notch by a striker carried on a pendulum. The absorbed energy is measured by the decrease in height of the swing of the pendulum after fracture. Cf. ***Izod Test.***

Chartered Engineer (CEng) The style or title of a person who is registered as a full engineering member of any of the constituent bodies forming the Engineering Council. The minimum standard is laid down by the Engineers Registration Board. Cf. ***engineer.***

chaser (comb tool) A lathe tool for cutting and finishing internal or external screw threads, usually the latter. The edge of the tool is the counterpart of the screw section.

chasing The cutting or finishing of screw threads with a ***chaser.***

chasing attachment A special feed motion built into ***capstan lathes*** and ***turret lathes,*** the special ***lead screw*** being driven by a shaft from the ***feed box*** thus permitting large-diameter threads to be formed with a ***chaser.*** Small-diameter threaded work is usually formed with a ***diehead.***

chassis The base-frame of a vehicle.

chatter The vibration of a blunt, or badly set or insufficiently rigid cutting tool giving an irregular surface finish on the workpiece.

check Any piece or device intended to control or restrain motion.

check gauge A gauge used for checking the accuracy of other gauges, normally for the verification of individual dimensions. Cf. ***reference gauge.***

check nut ***locknut.***

check rail (guard rail, safety rail, side rail) A third rail laid on a curve alongside and near the inner rail to keep the wheel flanges against the main rail.

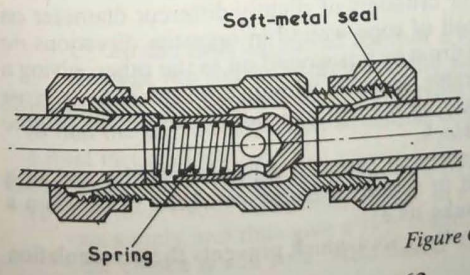


Figure C.9 Check valve (non-return valve).

Marlborough wheel An extra wide ***gearwheel*** which enables it to mesh with more than one standard width gear wheel even if the standard width gears share a common radial disposition relative to the Marlborough wheel. (*Figure M.5*).

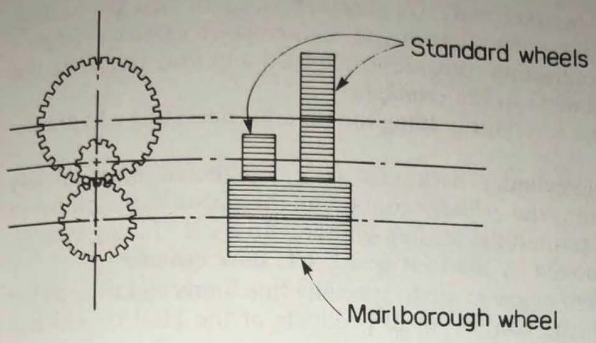


Figure M.5 Marlborough wheel.

Marshall valve-gear A radial gear of ***Hackworth*** type in which the straight guide is replaced by a curved slot to correct inequalities in steam distribution.

masked valve A ***poppet valve*** with its head recessed into its seat so that its outer diameter acts as a piston valve, thus allowing a lower valve acceleration.

mass The quantity of matter in a body; the weight of a body divided by the ***acceleration due to gravity***. Mass is a quantitative measure of ***inertia*** (q.v.).

mass balance weight (*a*) A ***mass*** added to a body to produce a desired balance or inertia about some predetermined point. See ***balance*** for ***static balance*** and ***dynamic balance***.

(*b*) A mass attached to an aircraft's control surface to reduce or eliminate the inertial coupling between the angular movement of the control and some other degree of freedom of the aircraft. It may be a single lump of metal or be distributed along the span of the control surface and connected to it by a series of links. 'Static balance' is the condition in which the mass balance about the hinge axis is zero. It is one method of flutter prevention.

Mass Properties The Mass Properties of a body are usually considered in relation to a mass which is very sensitive to the forces required to keep it in a required position throughout a period of time, such as is required of a spacecraft. The term Mass Properties encompasses the mass, centre of gravity position, moments of inertia and cross products of inertia of any solid object or fixed assembly of solid objects. The properties are usually refered to cartesian coordinates. When fluid is present it is customary to treat it as a solid.

mast The vertical member in a derrick crane. See ***crane***.

coupling, double-slider See ***Oldham coupling***.

coupling rod A connecting-rod joining two cranks so that they work together as one.
(See *Figure L.6*).

cover (of a gate valve) See ***bonnet***.

Cowburn valve See ***dead-weight safety-valve***.

crab (crab winch) (*a*) A jib-less hoisting crane with a snatch block or running pulley pendant from the barrel.
(*b*) The travelling lifting-gear of a ***gantry crane*** (see ***crane***), mounted on a bogie and running on rails carried by the ***gantry***.
(*c*) A ***claw coupling***.

crack arresters (crack stoppers) Design features incorporated into a structure to impede the propagation of a brittle crack. These are particularly useful in large structures made by ***welding***. Often a different weld material is used locally, or in fabricated structures riveted members are added to the structure, the rivet hole often being sufficient in itself to arrest the crack before is reaches its own ***critical crack length***.

crampon A pair of grappling irons, working like a pair of scissors, used for gripping loads that have to be hoisted.

crane A machine for hoisting and lowering heavy weights using gear-wheels, chain barrel and chain.

balance crane A two-armed crane, one to take the load and the other counterpoise arrangements, which can be arranged as self-acting.

cantilever crane A crane in which the jib hangs out from the supporting member and is counterbalanced, such as is used for the transport of excavated materials from the bottom of a cutting to a spoil-bank, often by skips.

floating crane A large crane carried on a pontoon as used in docks, etc.

gantry crane A ***travelling crane*** equipped with legs which support it on rails at ground level.

goliath crane (*Figure C.22*) A giant ***travelling crane***.

hercules crane A steam ***travelling crane*** with a horizontal swivelling jib used in harbour works for the setting of concrete blocks.

horizontal crane A portable steam ***balance crane*** with horizontal cylinders.

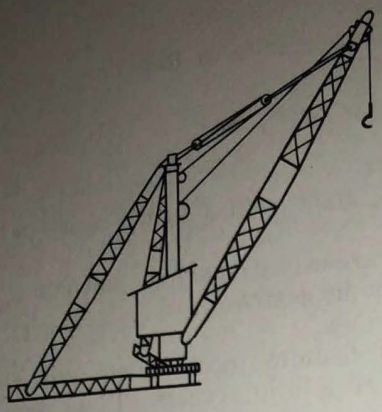
hydraulic crane A crane operated by hydraulic power.

jib crane A crane with an inclined arm (a jib) attached to the foot of a rotatable vertical post, supported by a tie rod connecting the two upper ends, the chain running from a winch on the post and over a pulley at the end of the arm.

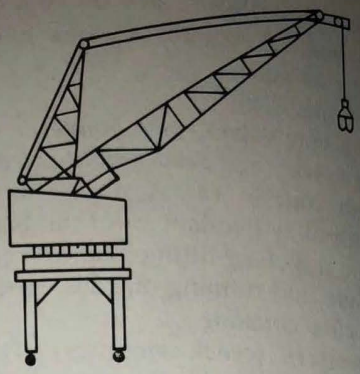
derricking jib crane A crane with variable radius of action obtained by changing the lengths of the tie rods between post and jib (*Figure C.22*).

travelling jib crane A jib crane with a travelling trolley on a horizontal jib which is mounted on the vertical post.

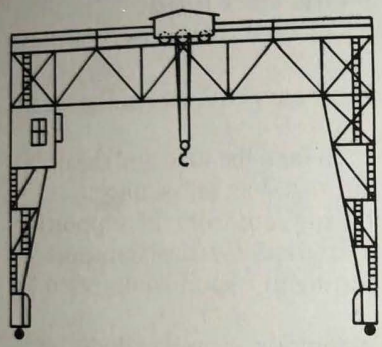
level-luffing crane A jib crane in which during ***derricking*** or luffing the load can be moved radially in a horizontal path with consequent power saving.



Derrick



Wharf crane



Goliath crane

Figure C.22 Cranes–derrick, wharf crane, goliath crane.

overhead travelling crane A workshop crane consisting of a girder mounted on wheels running on rails fixed along the length of the shop near the roof, and traversing and lifting are usually done by power or may be done by hand. This crane is also called a 'shop traveller'.

platform crane A ***whip crane*** independent of any support at the top of the post.

portal jib crane A jib crane mounted on a fixed or movable structure with an opening directly under the crane to permit the passage of wagons, etc.

post crane A jib crane with the post supported on fixed pivots at the top and bottom. The radius of the circle in which the hook travels is fixed when a tie-rod connects the post and boom; when ropes are used the radius can be varied.

rope crane A ***travelling crane*** driven by an endless rope which travels at a very high speed so that minimum of power is needed to lift a heavy load.

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Any slack in the rope is taken up by tightening pulleys with bearings in sliding frames counter-balanced by suspended balance weights.

steam crane A *crane* operated by a steam-engine.

titan crane A very large steam crane similar to a ***hercules crane*** but not provided with motions for slewing.

tower crane A rotatable cantilever crane pivoted at the top of a steelwork tower, either fixed or carried on rails. The lifting machinery and dead weights on the opposite side of the pivot balance the load.

vertical crane A steam crane with tall side frames. Cf. ***horizontal crane.***

well crane A fixed post crane with one-half of the post in a well with the lower end on a step and the fulcrum at ground level.

wharf crane A travelling or fixed crane on a quay which has a fixed radius of action (*Figure C.22*). Cf. ***derricking jib crane.***

whip crane (*Dutch wheel crane*). A light ***derrick*** with tackle for hoisting but no gearing.

crane hook The hook at the end of the lifting cable of a crane to which the load or sling chain is attached. See also ***Ram's Horn.***

crane post The vertical pillar of a jib crane to the top of which the jib is connected by a tie-rod.

crank An arm attached to a shaft carrying at its outer end a pin parallel to the shaft. See ***crankshaft.***

crank circle (crank path) The circle described by the ***crankpin.***

crank effort The effective force acting on an engine's ***crankpin.***

crank throw (*a*) The radial distance from the mainshaft to the ***crankpin*** and equal to half the stroke.

(*b*) The web(s) and pin of a ***crank.***

crank web The arm of a crank, usually of flat rectangular section.

crankcase The housing which encloses the crankshaft and connecting-rods.

cranking Hollowing of a tool immediately behind the cutting edge.

crankpin The pin which unites the web or arm of a crank with the connecting-rod of an engine or pump. (See *Figure C.23*).

crankshaft The main shaft of an engine, or other machine, carrying a ***crank***

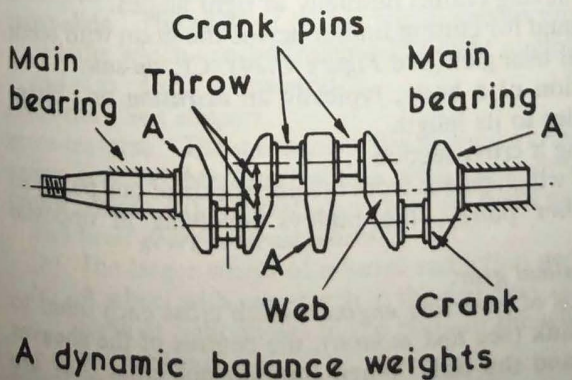

Figure C.23 Crankshaft.